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TELEVISION AND COLLEGE INSTRUCTION.

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DESCRIPTORS- *JUNIOR COLLEGES, *INSTRUCTIONAL TELEVISION, INSTRUCTIONAL INNOVATION, INSTRUCTIONAL AIDS, TELEVISION TEACHERS, CLOSED CIRCUIT TELEVISION, INSTRUCTIONAL MEDIA,

STUDIES OF THE EFFECTIVENESS OF INSTRUCTIONAL TELEVISION (ITV) HAVE SHOWN IT TO BE AT LEAST AS PRODUCTIVE AS STANDARD METHODS. WHEN IT IS AVAILABLE, THE COLLEGE TEACHER CAN SELECT THE MEANS BY WHICH HE CAN DO HIS BEST TEACHING. MANY TEACHERS REGARD ITV AS AN IMPORTANT AID WHICH FREES THEM FOR MORE EFFECTIVE TEACHING, GUIDANCE, AND EVALUATION. AS CLASSROOM LECTURES BECOME, IN EFFECT, PUBLIC APPEARANCES, PREPARATION AND DELIVERY BY THE INSTRUCTOR BECOME MORE METICULOUS, AND STUDENTS EXPECT A HIGHER LEVEL OF PERFORMANCE. LEGAL PROBLEMS ARE FOUND IN MATTERS OF ROYALTIES, RESIDUALS, AND RERUNS. MOST OF THE DIFFICULTIES WHICH ARE EXPECTED AT THE INITIATION OF ITV PROGRAMS CAN BE OVERCOME BY COOPERATIVE PLANNING AMONG TEACHING COLLEAGUES, PREPARATION WITH THE SKILLS OF VISUAL AIDS SPECIALISTS, PRODUCTION IN COOPERATION WITH EXPERIENCED TELEVISION CREWS, AND INTEGRATION INTO THE TOTAL INSTRUCTIONAL PROGRAM WITH THE HELP OF COMPETENT CLERICAL PERSONNEL. RESULTS OF STUDIES AND EXPERIENCES WITH INSTRUCTIONAL TELEVISION ARE CITED. (WO)

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LOS ANGELES CITY SCHOOL DISTRICTS

Division of College and Adult Education

TELEVISION AND COLLEGE INSTRUCTION

A Summary Prepared for

The Los Angeles City Board of Education

UNIVERSITY OF CALIF.
LOS ANGELES

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F O R E W O R D

The seven colleges in the Los Angeles City Junior College District are in a favorable position to welcome the advent of educational television to the Los Angeles area. Our public junior colleges are fortunate in having exceptional teaching staff in all areas of instruction. We also are privileged to have nationally recognized experts in the area of tele-communications. We are grateful to Dr. Isabel Beck, Counselor-Psychologist at Los Angeles Harbor College, for her personal investment of time and effort in preparing this comprehensive summary of the current role of televised college instruction and to her husband, Dr. Lester F. Beck, for his invaluable assistance. Appreciation is expressed to all who have contributed.

Limited but significant experience with closed and open circuit television supports the judgment that the junior college can well meet a part of its responsibility for instruction and community service with the aid of television. This summary with the sources it lists should accelerate this next step in making our open-door colleges still more readily available. It supports continuing efforts to secure reimbursement for a fair share of the cost of such instruction from the State.

Walter T. Coultas
Assistant Superintendent,
Junior Colleges

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Associate Superintendent,
Division of College and Adult
Education

PREFACE

This report summarizes the experience of colleges who have used television in instructional programs. Fourteen documents, selected for their relevance to freshman and sophomore college teaching, are listed at the end, with page references for the subjects summarized here.

The writer believes that television wisely used and fully exploited can foster excellent instruction, allowing great flexibility in using the best talents of educational personnel, and reaching unlimited numbers of students at reasonable cost. This is based on numerous published reports, from which the fourteen mentioned above were selected, and on personal observations of college instructional television. On two occasions, the Los Angeles City Board of Education approved opportunity leaves for this writer to participate in research and development projects involving new educational media. It is gratifying that some of that experience now may be useful to the Los Angeles Junior College District.

Isabel H. Beck, Ph.D.
Los Angeles Harbor College
January, 1965

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SUMMARY

Instructional television meets a variety of needs. Broadcast ITV reaches all functioning receivers in a geographic area, carrying instruction into the schools and colleges and also to a population not otherwise reached by the educational services of a community. Thus, housewives, invalids, prisoners, gifted youngsters, and working people who cannot attend classes and might be reticent to enroll in college if they could, can receive college instruction wherever they are.

Both broadcast and closed circuit television, with cable lines to receiving sets, can link several colleges or several rooms in one college, allowing cooperative teaching of common subjects and sharing resources for other courses which cannot be taught on every campus. This conservation of professional talent permits more attention to individual students, not less as was feared when television was first suggested as a medium for instruction.

With television, a choice of instructional programs is available to students. Some prefer and need in-person instruction - usually the younger college student. Other more mature students prefer "total TV" instruction, studying independently as they follow the televised lectures. For many, a combination of the two is best. These students view TV lectures and attend additional classroom meetings for discussions, laboratory practice, and periodic evaluation. The fact that each of these arrangements attracts substantial numbers of students has raised the question of validity of some ancient assumptions about teaching. Classroom acquaintance with every instructor apparently is neither needed nor desired by many students. In fact, a classroom with a competitive climate may interfere with the learning of less able students or students who feel they have been out of school too long.

The addition of television and other new media in education have not reduced the importance of books, laboratories, and teachers but have stimulated inquiry into ways of using all resources -- both old and new -- to help increased college populations cope with knowledge and human responsibilities in an expanding changing environment.

The tenor of this report is expressed in the following key excerpts:

1. Research on student performance shows that television is a medium through which students can learn effectively and independently.

2. With instructional television available, a college instructor may choose his role. He can devote himself to the way of teaching he prefers and does best -- lecturing, leading discussions, or guiding students individually, and students can have the benefit of varied instructional experience.

3. Effective teaching by TV is not inexpensive, but it can bring uniformly high quality education to everyone -- a traditional national goal in the United States.

4. Studies of scholastic aptitude and achievement indicate that students with all levels of ability achieve at least as much with ITV classes as with classroom instruction, and some have shown that students with low ability tend to learn more from ITV than in the classroom.

5. Students whose instructors are enthusiastic about TV instruction like their TV classes. Students of skeptics are themselves skeptical or disapproving.

6. Some reports indicate that students in ITV classes feel they learn less than in conventional classes, even when achievement tests show no significant difference, but most say they prefer superior teaching by TV to mediocre teaching in the classroom.

7. Mature, able students adapt and achieve well with instruction by TV, and ... given a choice they will re-enroll for TV classes.

8. Realization that TV is a powerful medium by which outstanding efforts in creative teaching can be enjoyed by a wide audience has served to challenge instructors in all college subjects.

9. The intimacy and adaptability of TV in competent technical hands have been strong influences in shaping faculty attitudes, in making successful TV teaching possible in many subjects, and in adding new techniques to teaching methods. TV has added new dimensions to all of teaching.

10. The thought of facing demands of TV preparation without assistance understandably is disquieting. The experience of meeting the demands with logistic support can be, and has been found to be, challenging, stimulating, and professionally rewarding by those brave enough to try.

11. Many classroom instructors now regard ITV as an important source of core material or supplemental material which frees them for more creative teaching, guidance, and evaluation.

12. The great variable in effective teaching still is the teacher, not the medium nor the method.

13. Experience indicates that community support is strong for stimulating, adult subject matter presented in a scholarly setting, that there are few critics, and that statements televised to a large audience or available for re-runs are less subject than heresay to unchallenged misinterpretation or distortion.

14. Because of its flexibility and the considerable skills of studio crews, TV places very few restrictions on teaching style -- in fact, it facilitates variety and can take a whole class on a field trip any time. The product of a creative instructional staff and a skilled TV crew is a formidable advance in educational quality.

15. A closed circuit system ... can assist college services as well as instruction.

16. The best TV courses are planned in cooperation with teaching colleagues; prepared with the skills of visual aids specialists; produced in cooperation with experienced TV crews; and integrated into the total pattern of instructional services with the help of competent clerical personnel.

17. In a large metropolitan area, or with several colleges cooperating, broadcast ITV is an economical way of providing quality education to unlimited numbers of students, both for college credits and for personal growth.

18. Telecourses have been broadcast to receptive audiences at all hours of the day from 6 a.m. through 9 p.m. Late afternoon seems to be the least desirable time during this span for ITV broadcasts.

19. When classroom lectures become public appearances several things happen: preparation and delivery by the instructor becomes more meticulous; students expect a higher level of "performance"; citizens of the community have an opportunity to observe and criticize or praise; and, as with any form of mass communications, legal restrictions increase.

20. The problem of royalties and residuals was ignored in the early days of ITV, but it did not go away. Recommendations are that contract agreements be completed before TV production begins; that terms of use by local institutions be defined; that provisions be made for royalties to the instructor if video tapes are sold to or used by other institutions; and that residual payment (monetary or reduction in teaching load) be allowed for use of the tapes beyond the original agreement period.

21. From TV presentations (a student) may begin to understand the nature of the subject he is studying, and to observe the kind of people who make a career of it. From his classroom instructor he may be stimulated to evaluate and apply what he has learned; to test his ideas; to read more books, to develop critical thinking skills and a personal set of values; and to communicate what he has learned and what he believes.

I. INTRODUCTION

Instructional television no longer is a pioneer movement in education. By 1960-61, colleges and universities, institutes and junior colleges, and public school systems were offering more than 13,000 telecourses and had enrolled a million and a half students, with an additional five million using telecourses as supplemental material. Some 250 colleges alone were offering televised courses for credit, and groups of colleges in several states were beginning to cooperate in the production of telecourses for inter-institutional reception. In 1964, approximately seven million students received television instruction in the nation's schools and colleges and hundreds of thousands more were viewing TV courses at home.

Research on student performance shows that television is a medium through which students can learn effectively and independently. That students learn as well or better from television classes was well documented by research reports as early as 1956. Since then, literally hundreds of additional studies have confirmed this early finding.

Early hesitation by college faculties to adopt television as a medium for teaching has subsided as research results have become known. Concerns that with TV, teaching would become too impersonal have been overcome. This is illustrated by a comment from one professor using TV lectures in his classes: "If I had to go back to preparing routine lectures, I wouldn't be able to spend as much time with my students!" His role has changed and he likes the new one. With TV available, a college instructor may choose his role. He can devote himself to the way of teaching he prefers and does best - lecturing, leading discussions, or guiding students individually, and students can have the benefits of varied educational experience.

Although the earliest administrative enthusiasts for ITV saw the medium primarily as a way to reduce costs of instruction, the earliest teaching enthusiasts saw it as a way to improve instruction, Experience supports the prediction of the teachers. Effective teaching by TV is not inexpensive, but it can bring uniformly high quality education to everyone -- a traditional national goal in the United States. As with all technology in this industrial nation, however, costs of facilities and equipment are declining, and a reasonable number of enrollments assures that TV instruction will cost no more and can cost less than traditional classroom methods.

The real potential of TV as a means of reducing housing and parking problems has not been exploited fully. With lectures transmitted by television, campus facilities can be reserved for studies which can be accomplished there only. The colleges of the future will house instructional materials centers, more conference and reading rooms and laboratories, and fewer lecture halls.

With these brief comments, this report turns to summaries of experience with broadcast ITV in teaching freshman and sophomore college courses throughout the United States. Topics to be covered include learning and teaching with TV, supporting ITV, some special concerns with broadcast TV, and the relationship of ITV to other educational media.

II. LEARNING FROM ITV

A. Student Achievement

In assessing student achievement with ITV, most research reports have used amount of learning with traditional classroom instruction as a standard for comparison. A number of variables have entered into these studies: subjects, methods, instructors, length of classes, size of classes, and role of ITV as total instruction or as a supplement. Before-and-after examinations of subject achievement have been the usual criterion for judging effectiveness of teaching conditions, but assessment of critical thinking and surveys of attitudes among students and observations of behavior also have been conducted and show results favorable to ITV.

One basic question arises in these studies: does a fair comparison between classroom and TV instruction require that the two kinds of classes be taught in exactly the same way by the same instructor, or should the presentations reflect the unique strengths of each medium? Another difficult question concerns the elimination of instructor bias. If an instructor prefers one medium over the other, his teaching effectiveness may be greater in that medium, regardless of which it is.

In spite of knotty design problems such as these, hundreds of comparative performance research reports have been published. Examples of college studies are summarized in Table 1.

TABLE 1.

Reported Studies Comparing Achievements of Students in TV Classes and in Traditional Classes

College	Subject	Performance
Chicago Junior Colleges	Biology	More learning from TV
	English	No significant difference
	Political Science	No significant difference
	Social Science	No significant difference
Michigan State University	Typing	More learning from TV
Oregon College of Education	Human Development	No significant difference
Oregon State University	Chemistry	No significant difference
	Hygiene	No significant difference (2 sections) More learning from TV (1 section)
Pennsylvania State University	Business Law	No significant difference
	Chemistry	"
	Meteorology	"
	Music Appreciation	"
	Psychology	"
	Sociology	"
Portland State College	Psychology	No significant difference
Purdue University	Analytic Geometry	No significant difference
	Bacteriology	"
	Chemistry	"
U. S. Naval Academy	Electronics	More learning from TV
University of Houston	Biology	No significant difference
	Psychology	"
Western Reserve University	Psychology	More learning from TV

With these and other studies which show similar results, educators were assured that instruction by TV is at least as productive as by classroom methods. Attention for the past several years has turned from assessing the effectiveness of TV as a teaching medium to testing student achievement under various TV conditions. One study, for example, found in an inter-institutional ITV program that students in receiving colleges and in originating colleges show similar achievement -- in spite of strong historic rivalry between students and faculties of the institutions involved.

Some studies have compared performance of students who watched TV lectures at home with those who watched in unsupervised classrooms on campus. Such studies indicate higher achievement by the home viewers. Further investigation has shown that home viewers generally are more mature and more highly motivated to learn. Young college students who take classes by TV at home often do less well than do the older ones, and also do less well than do young students in TV sections on campus. Moreover, young students achieve less in exclusively TV classes than in classes using partial TV instruction or traditional methods.

It has been pointed out that while younger home viewers are less disciplined -- they tend to skip lectures and let assignments slide -- this opportunity for independent study is preferred by many mature students.

Studies of scholastic aptitude and achievement indicate that students with all levels of ability achieve at least as much with ITV classes as with classroom instruction, and some have shown that students with low ability tend to learn more from ITV than in the classroom. Without bright agressive classmates who dominate classroom discussions, less able and less confident students can progress without anxiety at their own rates. A marginally prepared student can audit a class as a silent viewer the semester he might have failed if enrolled, then repeat the course for credit with an improved chance for success. With TV, various rates of learning and different psychological sets can be accommodated.

B. Student Attitudes

Innovations often are rejected irrationally when forced upon people, but may be accepted with high hope when presented as a choice. So it has been with ITV among both students and faculty. Students who enroll voluntarily in ITV classes have expected good preparation by highly qualified instructors and the opportunity to observe a variety of viewpoints. Two difficulties were anticipated: loss of personal relationship with the instructor and lack of opportunity to ask questions. But it has been found that some students prefer ITV for the very reason that lectures cannot be interrupted by questions and digressions. Many point out that most students do not ask questions anyway, particularly in large lecture sections.

Solution of the problem of personal contact has been sought in several ways: in some programs the TV instructor meets occasionally with TV students. Sometimes office hours have been maintained for interviews in person or by telephone with students. The most satisfactory arrangement, probably, for young college students provides a TV lecture and a classroom instructor.[1] Under these conditions, attitudes of the classroom instructors are crucial determinants of students' attitudes. Students whose instructors are enthusiastic about TV instruction like their TV classes. Students of skeptics are themselves skeptical or disapproving.

Some reports indicate that students in ITV classes feel they learn less than in conventional classes, even when achievement tests show no significant difference, but most say they prefer superior teaching by TV to mediocre teaching in the classroom. When teaching quality is not a variable, recency of experience with various teaching conditions seems to influence preferences: one study compared student attitudes when three sections of the same course were taught by one instructor -- a TV class, a conventional class, and a correspondence class. Each group showed a majority preference for its own instructional method, although the students themselves had not chosen the methods of instruction.

A study of attitudes of Oregon College-of-the-Air students who received all their lectures on home TV compared responses by marital status, age, and economic status. (Two-thirds of the enrollees were women.) The strongest support for ITV and the greatest concern for quality education through this medium came from married students over age 25 with low economic status.

Studies of attitudes of Chicago TV College students show that among students who earned A.A. degrees with a combination of conventional classes and ITV classes, one-half accepted without reluctance, or preferred, ITV, and that the greater number of ITV courses taken, the greater the preference expressed for this medium. Most students found ITV courses more demanding, and those who attended other colleges after graduating from junior college reported that grades in advanced courses were the

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[1] This may not always be true. As greater responsibility for learning is expected of students, they may "learn to learn" independently at an earlier age.

same as earned in their ITV courses.[1] The majority felt that ITV courses are better organized and more effectively presented than conventional courses.

C. Student Behavior

Actual re-enrollment in on-campus TV sections of classes also available with traditional methods shows a high level of return by students who have taken courses by TV. A study of TV students in a three-term sequence of General Psychology showed a selective factor by scholastic achievement. TV and traditional classes took the same examinations and were graded on a composite curve; most of the highest grades were earned by TV students all three terms. Very few TV students who earned grades of D or F re-enrolled in TV sections; a moderate number of C students and a majority of A and B students re-enrolled in TV sections the second and third quarters. Further comparison of volunteer on-campus students and lecture section students indicates that TV students were older and scored higher on a standard vocabulary test; women in the TV course earned higher grades than those in the lecture sections; men earned lower grades by TV than in lecture sections. Eighty-one total TV students who took the course through the Extension Division were much older (average 35 as compared to 21 and 22), scored higher on the vocabulary test, had higher over-all grade point averages, and earned higher grades in the TV class than did the on-campus students in either TV or lecture sections. These findings are consistent with other studies that show that mature, able students adapt and achieve well with instruction by TV, and that given a choice they will re-enroll for TV classes.

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[1] Independent study required in "total TV" classes may help prepare students for the self-discipline and responsibility required in junior and senior courses.

III. TEACHING BY ITV

Instructional Television is bringing about many changes in college teaching. Television teachers have noted that seeing themselves on video tape is conducive to serious re-examination of teaching practices, and most report changes in their methods not only for TV classes but in the classroom. Certainly TV gives dramatic emphasis to educational endeavor: a dull lecture is duller, enthusiastic discussion more stimulating. Good technical production can enhance an interesting presentation but it can't save a poor one.

College faculties generally have been reluctant to adopt ITV until its role in the total instructional effort has been defined -- a legitimate responsibility of faculty members themselves. Realization that TV is a powerful medium by which outstanding efforts in creative teaching can be enjoyed by a wide audience has served to challenge instructors in all college subjects. Observation of TV classes taught by colleagues also has allayed the charge that ITV is too impersonal -- never before have all the students been eye to eye with the professor. The intimacy and adaptability of TV in competent technical hands have been strong influences in shaping faculty attitudes, in making successful TV teaching possible in many subjects, and in adding new techniques to teaching methods. TV has added new dimensions to all of teaching.

A. Instructor Attitudes

Rejection of instructional TV by instructional personnel has been attributed with too much emphasis to irrational conservatism. Studies of Nevitt Sanford and others show that the authoritarian-conservative person is consistent in applying his attitudes to all his activities. Why, then, should college instructors who generally are characterized as liberal in other matters resist new media in education? Tie this to the observation that instructors who reluctantly or skeptically have agreed to try teaching on TV have become enthusiastic about the medium. This seeming inconsistency may be explained by a study at the University of North Carolina of barriers to use of new media. Major deterrents to use of new media were listed by the faculty:

Limited financial support for acquisition of materials.....80%
Suitable materials not available 57%
Lack of information on materials 43%
Lack of technical assistance for preparation of materials ...42%
Lack of time to locate materials 40%
Lack of adequate facilities for show materials 38%
Films, equipment, or operators not available when needed.....33%

Instructional TV projects have solved every one of these problems. From the beginning, with commercial television as a model, strong logistic

support has been given teachers on TV -- support never dreamed of by teachers in the classroom. Materials have been acquired or devised, technical assistance supplied, released time for preparation granted, and unheard of technical facilities made available. No wonder the majority of those who have tried it have liked it!

Surveys of faculty attitudes toward ITV support the implication in the above paragraph: as instructors become familiar with the medium under supportive conditions, their enthusiasm rises. Earliest surveys showed hostility or indifference by majorities of faculty members, while most of the dissidents admitted to never having seen a televised class. Some of the hostility undoubtedly was generated by early administrative support of ITV as a means of reducing costs of education through reduction in teaching staff. Some probably arose from apprehension at assuming the public role of the ITV lecturer, with its attendant loss of classroom privacy. The classroom lecture completely controlled by the instructor and uncomplicated by controversy is comfortable. The thought of facing the demands of TV preparation without assistance understandably is disquieting. The experience of meeting the demands with logistic support can be, and has been found to be, challenging, stimulating, and professionally rewarding by those brave enough to try.

The other member of the ITV teaching team, the instructor in the receiving classroom on campus, also was threatened -- by early talk of "master teachers" on TV. The image of the classroom instructor as a second class professional was inferred. With the realization that TV, like film and radio, is another visual aid which can be turned on and off at any time, this image has faded. Many classroom instructors now regard ITV as an important source of core material or supplemental material which frees them for more creative teaching, guidance, and evaluation.

B. Subjects

Although courses from every traditional college department have been taught successfully over TV, there is little evidence to show that any one course or kind of course is more adaptable than others to the TV medium. The uniform evaluation results indicate that with resourceful, creative effort any subject can be taught or constructively supplemented through ITV. The great variable in effective teaching still is the teacher, not the medium nor method.

While instruction in technical courses is not included in most college curricula and therefore has not been developed widely in college ITV programs, information from the armed forces, adult education, and high schools indicate that junior college level instruction in technical subjects very well can utilize TV. Among the courses taught effectively through ITV are typing, basic electricity, introductory electronics, slide rule, industrial supervision, sewing, food preparation, and map reading.

At the college level, technical or occupational courses have been taught in business and industrial supervision, magazine writing, copy editing, fire science, design, agriculture, accounting, salesmanship, shorthand, and typing.

Examples of traditional college courses which have been taught by television are given in Tables 2 and 3.

It was anticipated by some that instructors and institutions would invite criticism and public pressure with the presentation of sensitive or controversial material on broadcast TV, that the medium would limit discussion of legitimate college subject matter. Experience indicates that community support is strong for stimulating, adult subject matter presented in a scholarly setting, that there are few critics, and that statements televised to a large audience or available for re-run are less subject than heresay to unchallenged misinterpretation or distortion.

TABLE 2.

Examples of College Courses Taught by Television

College	Subjects
University of Akron	Reasoning and Understanding Science, Effective Speaking
Dade County Junior College	Basic College Mathematics, Basic College Spanish
University of Florida	French, Humanities, Survey of Communications
Miami University (Ohio)	English, Physiology, Zoology
University of Miami (Florida)	Development of Western Civilization, Man in Contemporary Society, Composition and Humanities[1]
Oregon State System of Higher Education	Appreciation of Literature, Chemistry, Descriptive Geometry, Geography, Geology, Psychology
Pennsylvania State University	Accounting, Air Science, American History, Anthropology, Differential Calculus, Economics, Education, Meteorology, Music, Psychology, Sociology, Zoology
University of Texas	American History, Chemistry, German, Introduction to Visual Arts, Psychology
San Bernardino Valley College	American Economy, Biology, Fire-fighting Practices, Political Science, Practical English, Western Civilization

[1] In 1962, enrollment in these courses had been 2600, 2600, and 2300 respectively.

TABLE 3.

Courses Offered by Television
by
Chicago City Junior College, 1956-1964

Subject	Number of Times Presented
ART	
Contemporary Art	1
Creative Art	1
BIOLOGY	
First Course	6
Second Course	5
BUSINESS	
Accounting, Fundamentals	2
Accounting Principles	1
Law, Business	2
Management, Personnel	1
Salesmanship	1
Shorthand I (Gregg)	2
Shorthand II (Gregg)	1
Shorthand (Pitman)	1
Typewriting I	3
ENGLISH	
Composition, First Course	6
Composition, Second Course	5
Business Writing	2
Literature, Fiction	2
Literature, American	2
Literature, Shakespeare	2
Reading, Developmental	2
HUMANITIES	
First Course	6
Second Course	4
World Literature	2
Philosophy, Problems in	2
MATHEMATICS	
Fundamentals	4
Algebra	3
Slide Rule	5
MODERN LANGUAGE	
French I	1
German I	1
Russian I	3
Spanish I	2
Spanish II	1
PHYSICAL SCIENCES	
First Course	4
Second Course	4
Astronomy, Descriptive	3
Mechanics and Heat (Lab.)	1
SOCIAL SCIENCES	
First Course	4
Second Course	4
Anthropology	1
Economics, Principles of	2
Economics, Problems	1
Government, Municipal	1
Government, National	2
History, American from 1865	2
Psychology, Child	3
Psychology, General	4
Sociology, Human Relations	1
SOCIAL SCIENCES (EDUCATION)	
American Public School	3
Communications Media	3
Educational Psychology	1
Human Relations Overview	2
Measurement and Evaluation	1
Philosophy	2
SPEECH	
Fundamentals	4

C. Methods

Television, originally a showcase for entertainment, has adapted well to educational practices; educators have adapted to TV, and have found much that is helpful. There is great advantage to being able to call up film clips and slides on signal, to focusing student attention on a single object, to magnifying visual materials, to providing front-seat visibility to all students. Close-up views of still pictures, graphs, diagrams, laboratory demonstrations or the face of the lecturer are provided each student. A feeling of intimacy with the subject matter, as well as with the instructor, is possible. All methods of transmitting facts, ideas, attitudes, and values which are used in classroom instruction also are available on TV, and can be more effective because of longer time for preparation and elimination of stultifying repetition to successive class sections. Even a straight lecture with good camera work is likely to keep students' attention better than one from the platform which provides little variety of visual experience.

A major objection to TV instruction has been lack of opportunity to ask and answer questions. Studies of student behavior and teaching effectiveness in TV classes indicate that experienced instructors anticipate most of the questions which students would raise, and that students in TV sections have less desire to ask questions. Inter-communications systems have been tried in some programs but generally have been abandoned. It has been observed that questions are more relevant and comments better understood by all students following a well prepared TV presentation than during a lecture. The personal contact which seems to be needed by young college students is provided by classroom instructors who have shared the same TV experience with the students, from an informed point of view, and can challenge them, reassure them, additionally instruct them, review with them, test them, or do whatever seems best according to the subject matter and characteristics of the students. This combination certainly can meet the individual needs of students better than large, or even moderate, classes under traditional lecture methods, with interruptions, digressions, or no-questions-allowed.

Each possibility -- total TV, combined TV and classroom, or total classroom -- instruction is preferred by some students. But studies show that with few exceptions achievement is comparable under all three conditions.

Some TV instructors have seen lack of student feed-back as the major disadvantage of TV teaching. Studio classes have been tried, to remedy this, but in most cases were discontinued when it was learned that talking to the camera and a class simultaneously was less effective for both, and more difficult for the teacher. With experience, instructors find studio teaching peculiarly rewarding, particularly when review of one's work is possible by video tape. Student feed-back, a strong component of self-evaluation in the teaching profession, is available readily in separate small group meetings with TV students.

Note-taking by students in televised classes often is difficult. TV lectures move too fast for them. There is far less redundancy in most TV lectures than in the usual classroom lecture[1] and the speaker cannot be interrupted or slowed down. The problem is solved with supplemental printed materials for each student, anything from a brief lecture outline to a course syllabus of the type long used in university correspondence courses.

Because of its flexibility and the considerable skills of studio crews, TV places very few restrictions on teaching method -- in fact, it facilitates variety and can take the whole class on a field trip any time. It can follow the instructor anywhere and can focus attention on any part of a room. The following teaching aids are all used regularly in TV instruction:

Still pictures
Slides
Filmstrips
Motion pictures
Diagrams, Graphs
Maps
Title cards
Bulletin boards
Chalk boards
Easels
Overhead projectors
Demonstrations
Microscopes
Special events
Interviews, dialogues
Panels
Dramatizations

In addition to tracking moving objects and shooting through microscopes, cameras can overlay or invert images, move in for close-ups, withdraw for wide perspective, and permit views from many angles. Some studios can provide split frame images for simultaneous viewing of more than one object or event. With all their technical sophistication, production personnel in educational TV play a notoriously cooperative but non-tyrannical role when assisting teaching personnel. Because of their resourcefulness and skills, TV instructors have found them able to solve complex problems of communications in ingenious ways and depend on them regularly when preparing their TV presentations.

The product of a creative instructional staff and a skilled TV crew is a formidable advance in educational quality.

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[1] For this reason many TV lectures of a half hour are considered equivalent to a 45 or 50 minute class period.

IV. SUPPORTING ITV

A. Facilities

Good studio production facilities and transmission are second in importance only to the competence and versatility of the ITV instructor. While good facilities cannot conceal nor compensate for poor planning, poor facilities can conceal or detract from good planning. Many ITV operations equipped with far less than commercial studios turn out creditable productions. Closed circuit and broadcast television both have advantages in various institutional settings.

Closed circuit TV, in which images and sound are transmitted by cable (or partly by microwave relay) from studio to receiver, is comparable to a telephone system and requires no broadcast license. It may be complete with one institution, or link several for cooperative planning, production, and reception. It is a private line only to those receivers connected to the circuit; it can be used as a communication line for transmission of current transitory information or for immediate messages, as well as for prepared instructional material. A closed circuit system, therefore, can assist college services as well as instruction. During registration, closed classes can be posted instantly and simultaneously in various locations; entrance tests can be administered by one trained person to students in many proctored rooms; freshman orientation can be conducted at one time to all receiving locations; all areas requiring security measures can be monitored in one location by strategically placed cameras; students in performance courses such as speech, music, and physical education can view video tapes and evaluate their own work; a taped science demonstration can be available to all science laboratory students on call. Such a system with resourceful use can conserve professional time, and assist in improving both services and instruction.

Open circuit, or broadcast TV requires a federal license which authorizes operation on an assigned channel; it can be received by all functioning sets throughout a geographic area. It is more expensive, is available to a much larger audience, and requires advance planning and careful production in order to achieve its objectives. Either type of TV requires one or more studios with camera, sound, recording, and supporting equipment for production of instructional programs.

Instructional TV need not require capital outlay by a college for production and transmission. Contract agreements with educational TV stations for use of their facilities are in some cases preferable to operation of facilities on campus. A TV installation on a college campus usually is a training laboratory for students as well as a service to the institution and community.

B. Staff

Preparation of a TV course is not a one man job. Where instructional TV has been used widely, teamwork has been found necessary -- the team consisting of professional, technical, and clerical personnel. The best TV courses are planned in cooperation with teaching colleagues; prepared with the skills of visual aids specialists; produced in cooperation with experienced TV crews; and integrated into the total pattern of instructional services with the help of competent clerical personnel. The TV instructor is responsible for his own course, however, and should be willing and able to work cooperatively and with leadership with this diverse group of experts.

Instructional TV permits cooperative planning of college courses by a team of instructors, including the TV lecturer and instructors in receiving classrooms. Such courses are not limited by the experience or resourcefulness of one person and can be used more effectively by colleagues who have shared in deciding its content and structure. The receptive climate thus created encourages acceptance by students.

Television has stimulated more extensive use of visual aids than ever before, for several reasons. Technical personnel very quickly developed methods of coordinating TV cameras with projectors and microscopes, and cameramen have become highly skilled in making the cameras mobile and flexible in following movement, changing focus, and moving from one object to another. A variety of visual aids can be used in rapid succession without the instructor having to handle any equipment. Use of systems of visual aids now is possible and easy for the instructor. In addition, ITV has reinforced rigorous standards of performance for the teacher, through exposure to larger, more varied, and non-captive audiences. Striving for clarity and completeness in limited time has induced a search for ways of communicating ideas and information more clearly than by verbalizing, For these reasons, personnel specialized in the preparation of visuals for TV are indispensable.

Increased enrollments and a diversified pattern of enrollment (i.e., TV at home, TV on campus, for credit, for course materials only) create a need for clerical personnel to handle correspondence and the "mail-order logistics" of textbooks and materials; to type and duplicate syllabi and lecture outlines; to type program continuities to guide production crews; to handle library and visual materials; and to keep enrollment and examination records for increased numbers of students.

In addition, of course, are the technical crews who operate and maintain technical equipment, and the TV producers and directors whose importance has been intimated in the section of this report on Methods.

C. Costs

Costs of ITV vary so much with circumstances that no attempt will be made here to summarize them. Comparison with regular instructional costs of instruction within the same institution can be summarized briefly.

At San Francisco State College, cost studies of an experimental program of six broadcast ITV courses show the following: lecture-discussion classes using TV can be given to 950 enrolled students at a cost no greater than for classroom instruction; more elaborately produced courses require 1440 students to "break even".

After five years of broadcasting, Chicago's TV College[1] passed the "break-even" point with an enrollment of 800 full-time students. In the eighth year, 1963-64, regular class instruction cost about $550 per full-time student; TV costs were about $450 per full-time student.

San Bernardino Valley College[1] reports that in the third year of broadcast ITV costs are about the same as for classroom instruction at $512 per full-time student.

At Pennsylvania State University, closed circuit TV instruction was found to be feasible economically with an enrollment of 200 students in a single course.

Students in excess of the figures cited above can be enrolled at little additional cost, and the contribution to the community at large is not considered in these cost figures. In a large metropolitan area, or with several colleges cooperating, broadcast ITV is an economical way of providing quality education to unlimited numbers of students, both for college credit and for personal growth.

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[1] Reports of experience with ITV at Chicago City Junior College and San Bernardino Valley College are summarized in Appendix I and Appendix II of this paper.

V. TIME AND ITV

Two considerations of time are necessary in planning television instruction: preparation time and broadcast time, including the hour of the day and the length of presentation.

There has been considerable variation in estimates of time needed by an instructor to prepare lectures for television. Released time for planning is not regarded as an educational luxury but as proper utilization of professional skill in organizing, condensing, and communicating a body of knowledge for wide circulation. Preparation of one three-hour per week course is a demanding full-time assignment, and is feasible economically in terms of time saved from multiple preparations and deliveries by several instructors. One report says that television professors felt that one-half released time the semester prior to presentation and one-quarter time during the semester of presentation were inadequate. Many colleges have employed a telecourse instructor a full summer for preparation of one course and have granted half time release during the semester of presentation, with additional fractions of time for evaluation and revisions in subsequent semesters when video tapes were re-run.

Full-time release during the semester of preparation and half-time during the semester of presentation appears now to be a reasonable arrangement. Released time equivalent to re-run taped courses during subsequent semesters of use also is considered a reasonable residual compensation by agreement between the instructor and the employing institution.

Telecourses have been broadcast to receptive audiences at all hours of the day from 6 a.m. through 9 p.m. Late afternoon seems to be the least desirable time during this span for ITV broadcasts. This is the period when children's programs on commercial stations monopolize family TV sets, when wives and mothers are cooking, and husbands and fathers are on the way home from work. For the adult family audience, 8 or 9 p.m. probably is the best time for ITV broadcasting.

Early morning classes have drawn considerable enrollment among employed persons and attract enthusiastic audiences of middle-aged and elderly people accustomed to early rising and delighted to find intellectually stimulating activity at that time of day. Mornings and early afternoons, many women with home responsibilities are regular viewers, and often enroll for credit after a semester of viewing during which they develop the courage to take college courses. Evening broadcasts enjoy a wide non-credit audience and allow group participation with individuals in the family who are enrolled for credit. Parents and siblings can sample the studies of college students and be encouraged to attend college themselves. Husbands and wives can share intellectual experience heretofore available only to the one enrolled in college while the other made the living. When early morning classes were released on television in Portland, Oregon, some requests were received for midnight re-runs -- from people employed during late evening hours.

Duration of television lectures originally coincided closely with class periods -- usually 45 minutes for a 50-minute hour. This has been reduced to 30 minutes per class period -- either three 30-minute or two 45-minute presentations for a three hour lecture course. Improved organization and presentation condenses subject matter, allowing this saving in time, which the student may devote to other activities.

VI. THE LAW AND ITV

Broadcast TV opens up the classroom to public view -- not only to students, but to parents, taxpayers, and colleagues of the instructor. When classroom lectures become public appearances, several things happen: preparation and delivery by the instructor is more meticulous; students expect a higher level of "performance"; citizens of the community have opportunity to observe and criticize or praise; and, as with any form of mass communications, legal restrictions increase. When classes are recorded and available for re-runs, legal concerns are compounded. Although ITV can provide high quality instruction for many more students than could be accommodated in classrooms and can perform a general educational function for a community, it requires advance deliberation and understanding between the instructor and the institution.

The public nature of ITV poses two problems for the instructor: professional image and personal rewards. For the sponsoring institution, three questions are raised: royalties, residuals, and copyrights.

TV instructors have shown some concern for professional image when courses have been recorded on video tape for re-use. Preservation of out-dated lectures could cause professional embarrassment. It is now agreed generally that some provision should be made for revisions or deletions at the option of the ITV instructor. Contract agreements have specified various maximums -- in a general range from 10% to 30% -- of lectures in a series which may be redone in any one year. The instructor may select the material which is to be revised, and is allowed released time to make the revisions.

The problem of royalties and residuals was ignored in the early days of ITV, but it did not go away. Because of the newness of the medium, many instructors pioneered in TV without much thought of compensation either for original preparation or re-run of recorded lectures. In one college, the question really was not faced until an instructor, half-way through a series, decided to suspend production pending an agreement. Shortly after that, the National Education Association and the American Council on Education called conferences of educators to discuss the various questions associated with the rights and responsibilities of ITV teachers. The American Association of University Professors also considered these issues and published a statement. While much as been left open for negotiation between individual institutions and instructors, some general policies resulted from these deliberations. Recommendations are that contract agreements be completed before TV production begins; that terms of use by the local institution be defined; that provision be made for royalties to the instructor if video tapes are sold to or used by other institutions; and that residual payment[1] be allowed for use of the tapes beyond the original agreement period.

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[1] Monetary or reduction in teaching load.

The question of remuneration and royalties to ITV instructors bears a curious relationship to copyright law. Educators are accustomed to great permissiveness in the use of copyrighted materials for instructional purposes in the classrooms. This permissiveness has extended to broadcast TV which is produced and transmitted by noncommercial stations. As educational TV has grown, wide use of copyrighted materials has been made with very little challenge. Such use has not been tested in the courts. This happy condition has endured because of the non-profit public service nature of educational TV. If this non-profit characteristic were to change, then the free use of copyright materials surely would be challenged. Thus, monetary royalties and residuals to instructors, and sale of video tapes could restrict seriously the free materials available to the instructor in the preparation and presentation of TV classes. Release from and royalties to the copyright owners of films, pictures, literary excerpts, etc., then must be provided for by the sponsoring institution, TV production unit, or the instructor.

While some colleges have been quite casual in their use of copyrighted materials, Chicago TV College carefully writes for releases and has found them not difficult to secure, usually without charge. Occasionally a token charge is made by a copyright owner in order not to set a precedent of free use of the material.

VII. OTHER MEDIA AND ITV

As has been reiterated throughout this paper, TV is not an instructional medium unto itself. It is peculiarly adaptable to cooperative effort, and serves best when integrated into a larger educational design. In the first place, each TV class is a team effort. The smallest team consists of an instructor and a system of closed circuit equipment under his control -- a relatively primitive but sometimes effective arrangement. At the most elaborate extreme, 25 or 30 people may be involved directly in producing a television class, including the instructor and a committee of colleagues who determine the subject matter of each lecture and prepare the continuity for a series. Inter-institutional cooperation in the production and reception of televised classes is the pattern of the future. (Colleges in Texas, Florida, and Oregon already have regional TV ties.) This kind of cooperation is bringing excellent and unique educational experiences to all the campuses involved.

But ITV is cooperative in another sense, also. It integrates well with other educational media. It does nothing to reduce the importance of the book, the laboratory, or the classroom teacher.

In providing the basic orientation, the core material of a subject under study, it supplements the other important ingredients of college experience: independent study and professional guidance in the learning process. The student of the future may spend more hours at his learning tasks simply because there are more different things to do, and because their variety removes the drudgery from learning. From TV presentations, he may begin to understand the nature of the subject he is studying, and to observe the kind of people who make a career of it. From programmed instruction, he may learn details on his own. From his classroom instructor, he may be stimulated to evaluate and apply what he has learned; to test his ideas; to read more; to develop critical thinking skills and a personal set of values; and to communicate what he has learned and what he believes.

It was stated earlier that TV has added new dimensions to all of teaching. In doing this, it combines with other educational media to help increased college populations cope with knowledge and human responsibilities in an expanding environment.

VIII. CONCLUSION

While Instructional Television can provide a complete college course for the mature student and must be a complete course for those who cannot attend campus classes, it provides also a valuable service to the on-campus instructor and students. For the instructor it gives release from tedious repetition of lectures. For the students it provides lectures and demonstrations delivered with "first time" spontaneity by uniquely qualified lecturers. Thus, ITV provides opportunities for creative teaching, a variety of learning experiences, and development of critical thinking by providing a common core of information from which classroom instructors and students may explore significance and relationships.

With subject matter introduced by ITV and detailed in programmed materials, the classroom can be devoted to stimulating wider reading, deeper understanding, and creative applications of knowledge. With the classroom instructor providing inspiration and guidance, students may progress quickly through mastery of information to educational sophistication -- a level of critical analysis, evaluation, and decision making. This is the business of higher education.

Appendix I. The Chicago TV College

A program designed to offer an A.A. degree curriculum entirely by broadcast television was inaugurated in 1956 in Chicago with Ford Foundation funds. In 1959 the Chicago TV College was judged a success and since then has continued operation fully supported by the Chicago Board of Education.

Each semester eight or nine courses are offered in 25 hours of broadcasting each week over Community ETV station WTTW. In eight years over sixty different courses have been offered for credit. Two 45-minute lessons per week are given for each class: half the presentations are live, half are video taped re-runs. An organized curriculum is followed and courses are offered on a rotating schedule such that a full-time student can complete all A.A. degree requirements in two years.

Students may register for credit or just to receive study materials through Chicago City Junior College Campuses. (Many more watch the classes without registering.) All use off-campus TV sets to view the lectures, and mail required assignments to the TV instructor or a section instructor for evaluation and return. Final examinations are given on the college campuses or by responsible persons in local communities.

Students served by Chicago's TV College include persons handicapped by disability or illness, gifted high school students, inmates of penal institutions, and others who prefer home instruction over class attendance for various reasons. Ninety-five students have earned A.A. degrees entirely with television courses and 950 others have taken the equivalent of one semester or more by TV in earning A.A. degrees.

All of the TV instructors are drawn from the staff of the Chicago City Junior College. They are selected on the following criteria:

> "The television teacher must possess, above all, the qualities of the scholar. But scholarship alone is not enough. He must also have the temperament that enables him to accommodate himself to the demands of the medium. He must be so much at ease with his material that he need have no fear of exposure on open-circuit. He must be capable of planning his class work far in advance (something some fine scholars and teachers are incapable of) so that he can prepare his study guide and outline his lessons well before he makes his opening video presentation. Finally, he must possess another quality which many excellent scholars and teachers lack: he must be able -- and willing -- to work as a member of the team of which he is captain."[1]

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[1] Eight Years of TV College: A Fourth Report. Chicago Public Schools, 1964. Page 13.

Two months before the beginning of studio presentations, the instructor is put on special assignment to prepare his course and to train himself in the use of the medium. He also prepares a detailed study guide. During the semester of presentation, the TV class is his full load -- the equivalent of five classes on campus.

Retention in TV classes averages 75%. A tabulation of enrollments over eight years shows:

Over 80,000 individuals in over 120,000 course registrations
Over 34,000 students in over 53,000 courses for credit.

Non-enrolled viewers: 10,000 in 1956
200,000 in 1964

The annual cost of TV instruction per enrolled full-time student for credit in 1963 with about 850 FTE's was $450 as compared to about $550 per full-time classroom student. The Fall 1964 enrollment is 1277, which further reduced the cost per TV student.

Average daily attendance of TV students is computed on the basis of course enrollments and completion of written assignments in each class taken. Attendance reports are required monthly in Illinois. No verification of "attendance" at TV lectures is required of students.

APPENDIX II. ITV at San Bernardino Valley College

"Television was made for the junior college," says Dr. Sheffield, President of SBVC, as his college enters a third year of TV instruction with lectures prepared in its own studios, substantially staffed by well supervised students, and broadcast by its own transmitter. "We look forward to cooperation with neighboring colleges as they acquire television facilities," adds Dr. J. W. McDaniel, Vice-President, Instruction.

SBVC currently is offering TV courses in:

American Economy
Biology
Fire-fighting practices
Political Science
Practical English
Western Civilization

The following excerpt from a report by Dr. McDaniel describes the college TV instructional program.[1]

Instructional Television for College Classes has included the rebroadcast during day hours of the nationally televised "American Economy" course, and several college produced courses. During the first semester of operation a college biology teacher developed and taught a standard general biology course to approximately 600 campus students and a smaller number of off-campus students. This course involved the production of approximately fifty 45-minute lectures. Our station cut its teeth on this course. Since that time we have limited the length of a television lecture to thirty minutes. The biology course has been rebroadcast during each succeeding semester and has been the only scheduled class in general biology for both day and evening students. It has been necessary to broadcast the course at several different hours during each week. While we did not consider it desirable for us to duplicate in San Bernardino the numerous studies of the effectiveness of teaching biology by television, we have, of course, kept records on the course. I quote here a section of the instructor's report at the end of the first semester:

> "At this point in the presentation of this course it is the instructor's judgment that teaching biology in a single large group with the use of television is entirely feasible, and that the extent of student learning may be expected to be normal. From the viewpoint of instructional method the greatest advantages of television appear to be:
>
> 1) the excellence of the visual presentation of demonstrations involving magnification
> 2) the enforced necessity for precise course planning and the pacing of lecture presentations
> 3) the equivalency of presentation to all day and evening students that is assured by this method
> 4) the accumulation of the lectures for the entire course

[1] McDaniel, I. W., Educational Television at San Bernardino Valley College Abstract of unpublished report, 1964.

on video tapes that makes them available for re-use, and that frees the lecturer from repetition of the same work

5) the stimulation and constant pressure toward perfection of a new and exciting method of teaching."

In addition to the biology course during the 1963-64 academic year, other courses taught by television included:

History 4A-4B, Western Civilization -- a standard two semester humanities course.

History 10, American Foreign Policy -- a newly developed single semester non-sequence course offered primarily for the general student and adult home viewers.

Economics 10, American Economy -- a single semester non-sequence introduction to economics taught primarily for general students and adults who do not plan further specialized study in economics.

Business 108, Federal Income Tax Return Preparation -- an eight weeks course designed to help tax payers prepare their reports.

Typewriting 23A, Beginning Typewriting -- an eight weeks short course for home viewers.

Our television instruction plans for 1964-65 include the repeating of each of the above courses and the introduction of two new ones. Each of these involves the development of television instruction for high enrollment courses that are ordinarily offered in many separate sections. Political Science 1 is to be a three-semester course largely devoted to American Government that will be taught on-campus by short circuit to approximately 600 day students and 150 evening students. In addition to this, the course will be available as a credit course for home viewers.

Introduction to English Composition will be the lecture portion of a remedial English course that is to be released by both closed circuit and open circuit television to day campus students, evening campus students, and home viewers. This course will include all of the instruction necessary to integrate a four-hours weekly writing laboratory and a two-hours weekly reading period. These three segments, lectures, writing laboratory, and reading constitute an experimental program in the improvement of the teaching of "Remedial English." During the first semester of the year only 300 students will be enrolled in this experimental program. It is expected that at least 700 others will be taught an equivalent course by conventional procedures. Our hope is that the experimental program will prove to be more effective than the conventional procedures that the college has followed for many years in trying to improve the quality of writing of in-coming students. We are pinning many hopes on this course.

Response to ITV by on-campus and off-campus students has been good. Faculty response varies -- a few are hostile, many are indifferent, some are enthusiastic. Opportunity to participate in TV instruction is sought by more faculty members as time goes on.

Cost of TV instruction has not been out of line with the regular cost of instruction, according to Dr. Sheffield. The college last year had an ADA of 5,486 and provided instruction for $512.54 per student.

No problems regarding royalties, residuals, and use of copyrighted materials have arisen, although experience of other ITV stations is being watched. By "gentlemen's agreement" TV instructors may revise previously taped classes or may have tapes erased. No standard policy regarding released time for TV instructors is followed, partly because of reluctance of some to give up other classes and services to the college. Time agreements are arrived at individually with each TV instructor. No tapes have been sold, so the question of royalties has not arisen.[1] When a previously taped course is re-run, an equivalent number of class hours is deducted from the teaching load of the instructor if he so wishes. Whatever visual materials an instructor wishes to use are used; so far there has been no challenge of use of copyrighted materials. Clips from copyrighted films, however, have not been included in TV instruction.

The production studio and the broadcast station (with San Mateo, one of two operated by California junior colleges) are part of the instructional program of the college. A.A. degrees are offered in TV Production and TV Technology.

There has been no problem in collecting state funds based on ADA, including off-campus TV students. Each student enrolled for credit signs a statement of "attendance" at TV lectures received in his home, and course examinations include materials from all TV presentations. This procedure so far has satisfied state fiscal officers.

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[1] One series, however, is received at another college -- Fire science students at Barstow watch it -- but the question of inter-district financial exchange has not been raised.

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